Intelligent Water Distribution & Monitoring System

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Category: Internet Of Things

Skills Required:
IBM IoT Platform, IBM Nodered, IBM Cloudant DB

Abstract:

The project Intelligent water distribution system, as the name says it is all about management of water supply throughout the scale, right from small societies, townships to entire urban infrastructure and also for irrigation water supply management. Main task of the water distribution system is to maintain the water in the tank and also generate the water bills to the individual households which involves human efforts. This system can be automated using the Internet of things.

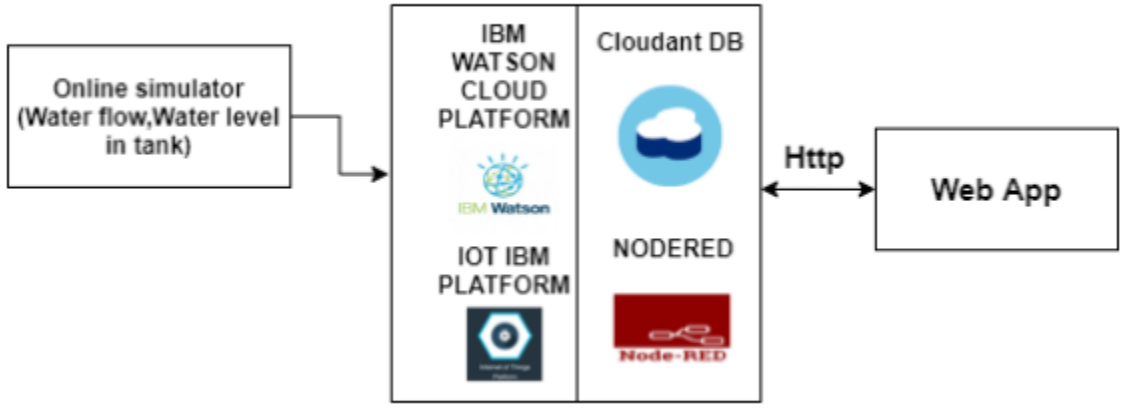
Solution Requirements:

The proposed system should continuously monitor the main tank water level and should automatically switch on/off the motors according to the tank water level and alert the admins.it should monitor the water flow of the individual houses and store the flow rate of each in the Cloudant DB to generate the water bills. Tank water level and the bills should be visualized in the dashboard so that the Admin can monitor them.

Project Flow:

- Main tank water level and Water flow to individual houses is continuously updated to IBM IoT platform (Use Online simulator sensor for water flow and water level)
- Create a Node-RED flow to get the data from IBM IoT platform and store it in cloudant DB.
- Display the tank water level in the UI
- Retrieve the flowrate of individual houses and generate bills and display them in UI.

Project Architecture:



Implementation:

Step1: IBM Academic Initiative Account is created

Step2: IBM watson IOT platform is created

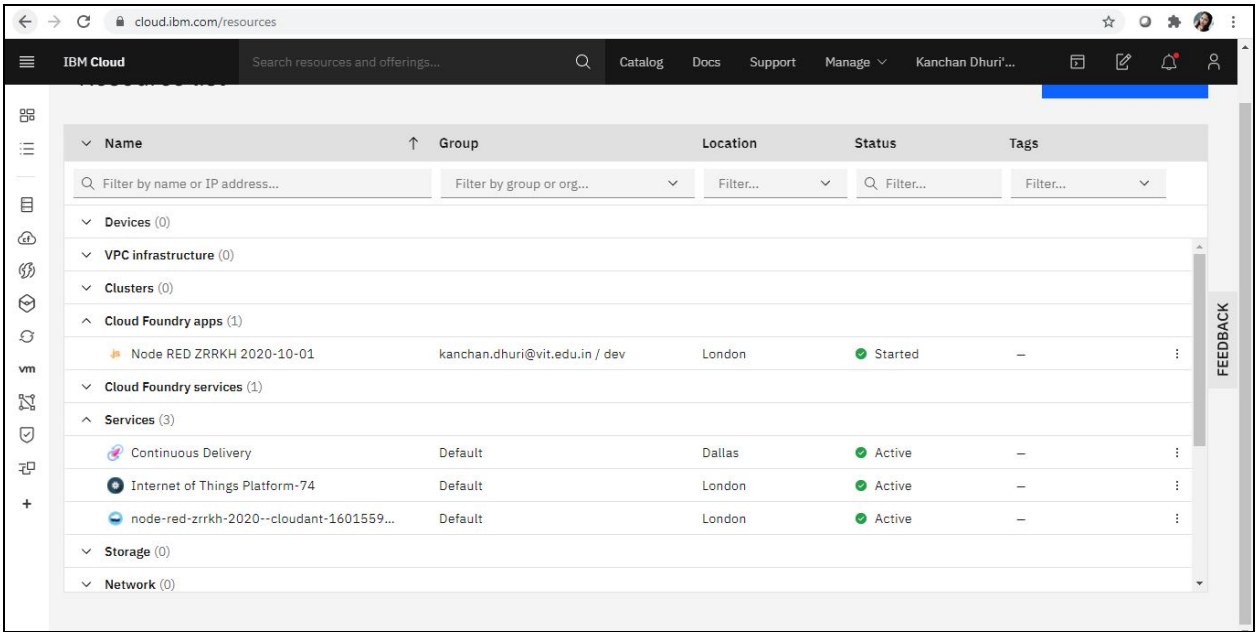


Fig1: on IBM cloud services are created : Internet of Things Platform-74 & Node-red

Step3: IOT platform configuaration

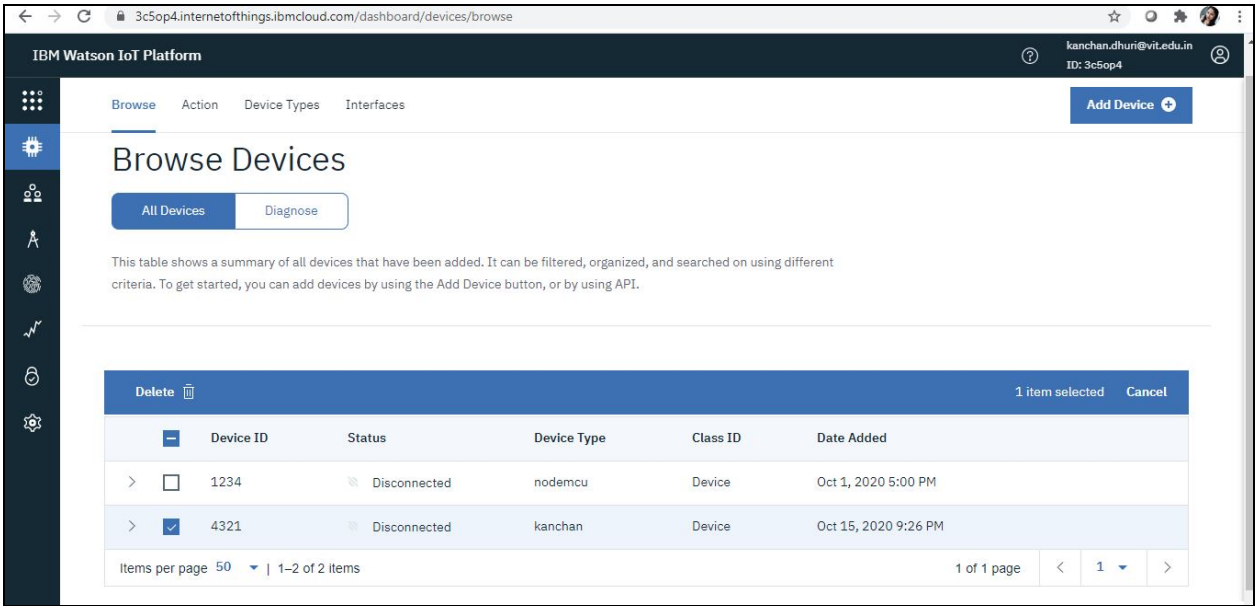


Fig2: IOT device is created and configured

Step4: Sensor configuration

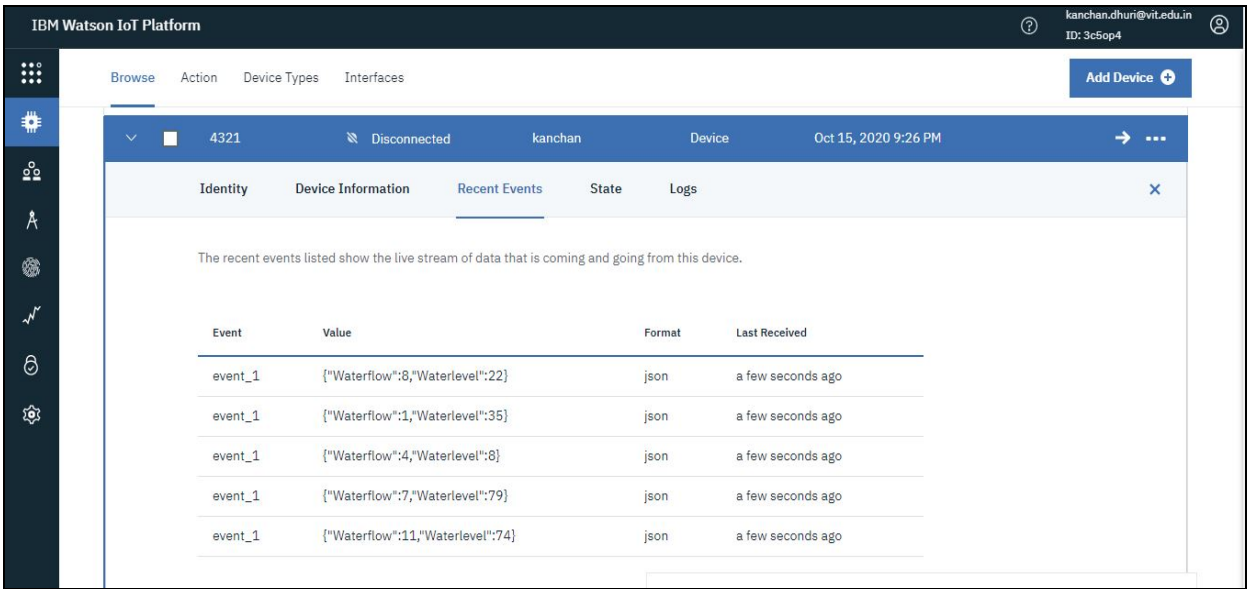


Fig3: Configured & connected online simulator sensors

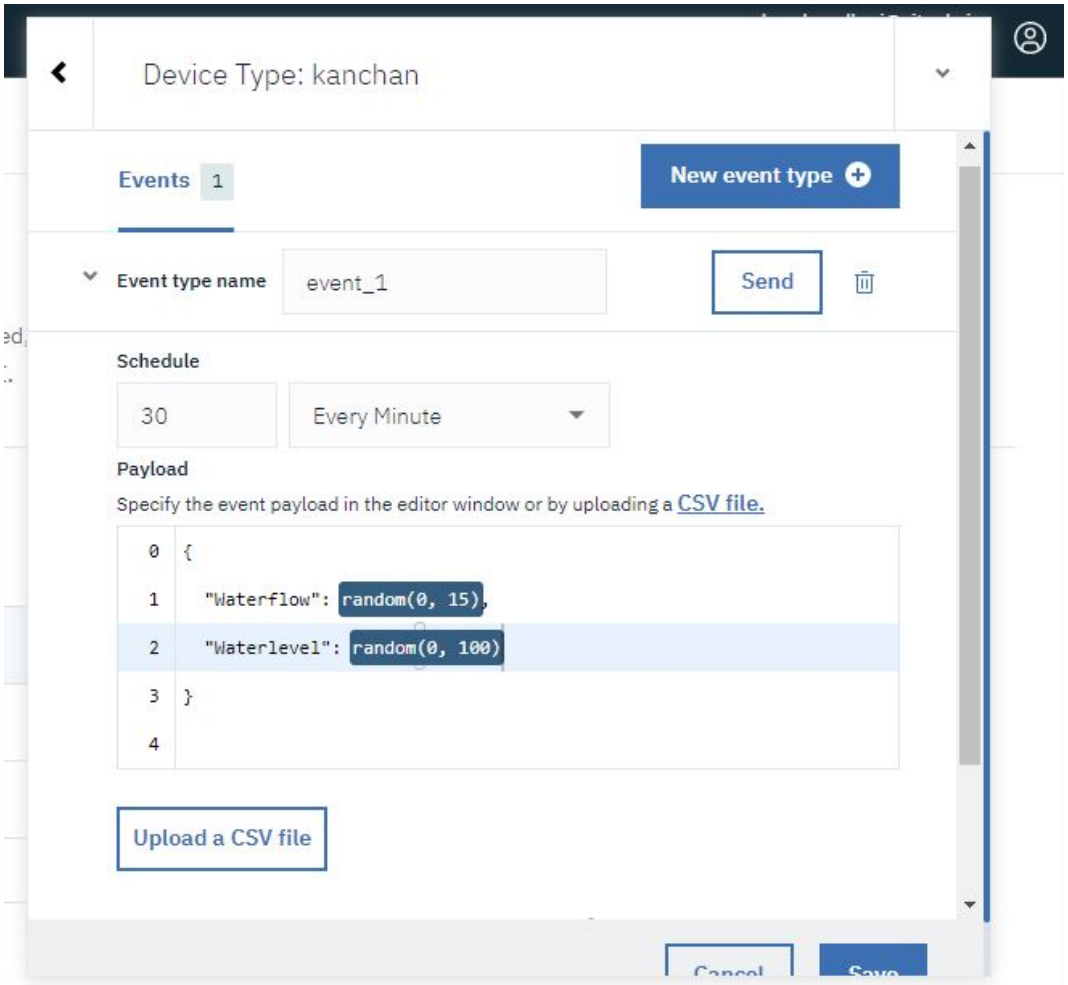


Fig4: Sensor configuration

Step5: Create & launch Node-Red Instance

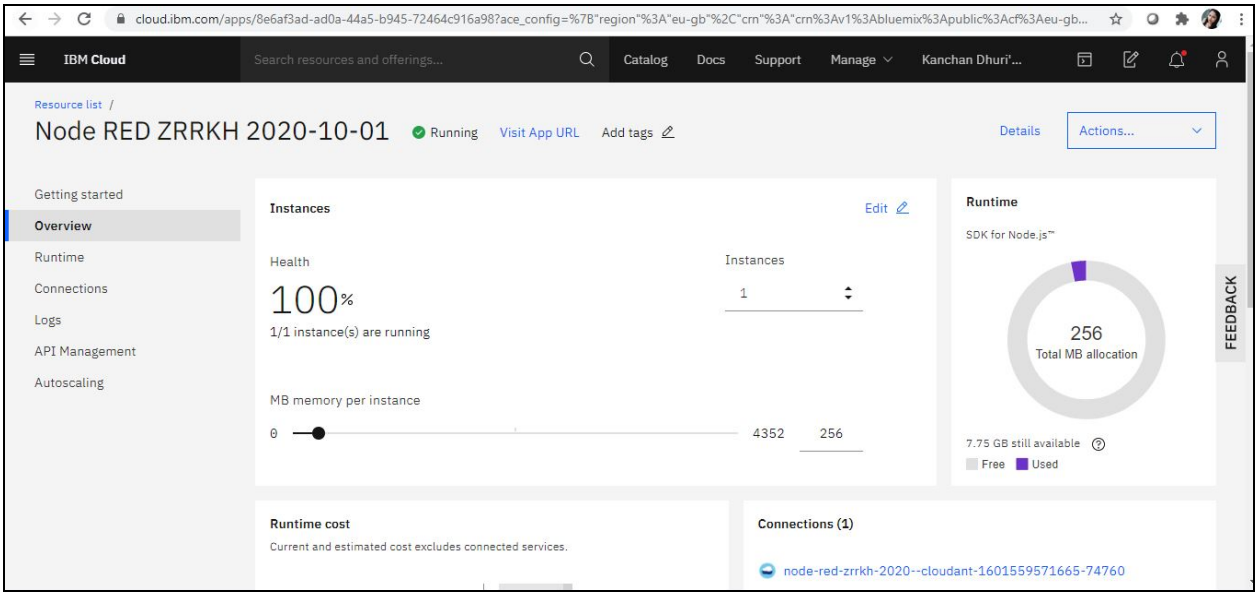


Fig5: Node-Red instance created & launched

Step6:Crete a Node-red flow to get data from IBM IoT device

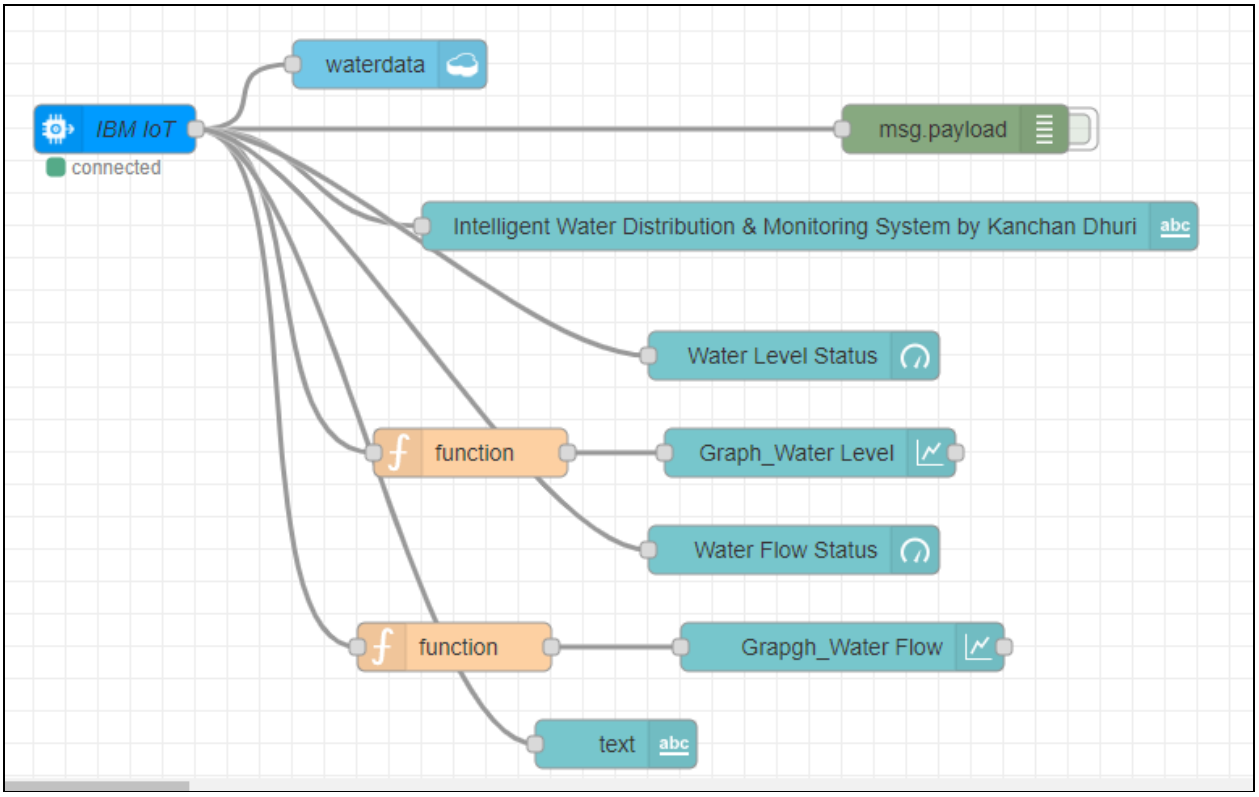


Fig6: Node-Red flow part1 to get & display sesnsor data on Web APP

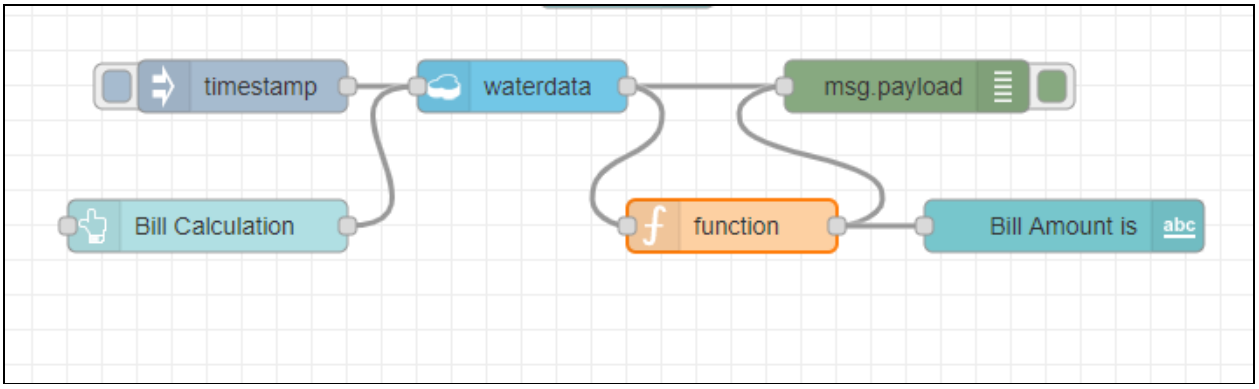


Fig7: Node-Red flow part2 to generate & display bill on Web APP

Step7: Configure the Node-Red flow to store data received from IBM IoT Device in Cloudant DB

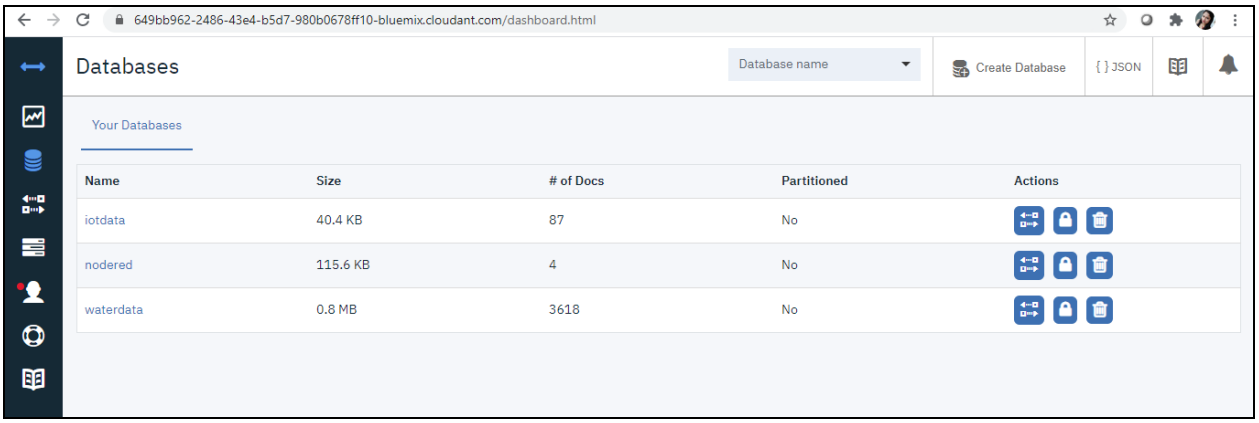


Fig8: Database is created named 'waterdata' to store sensor readings

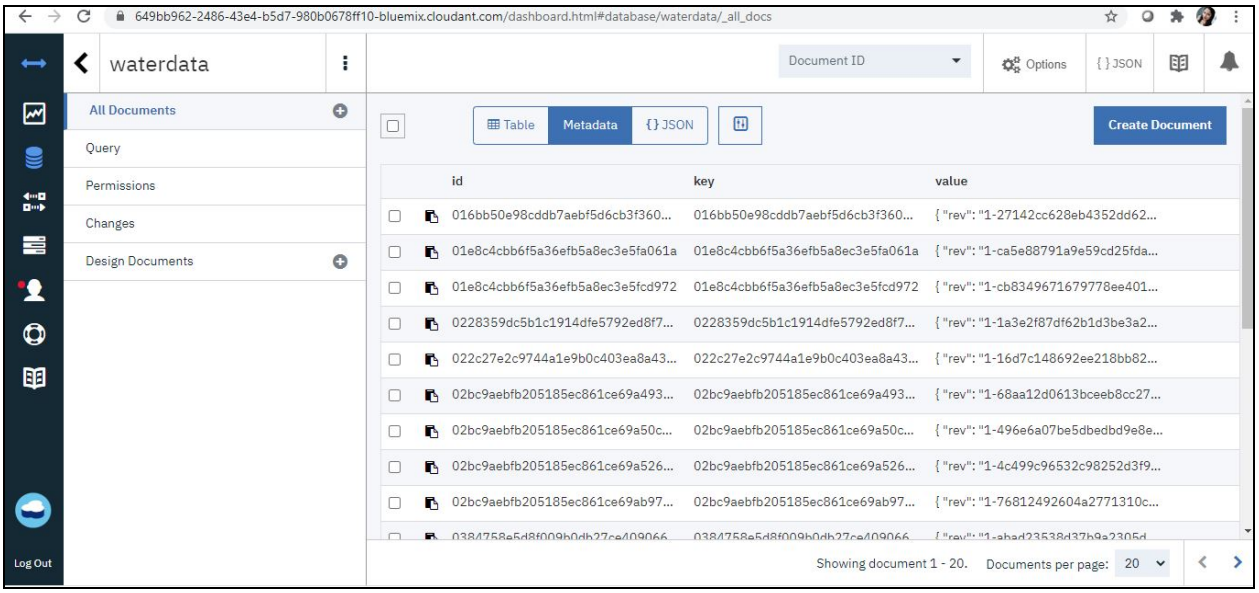


Fig9: Database files

Step8: Retrive monthly flowrate to calculate bill

Code:

```
//This is the function to multiply Waterflow parameter by 3 and
//add it to use one variable
valuelen=msg.payload.length

flow1=0;

for (i=0;i<valuelen;i++)
```

```
{
flow1=msg.payload[i].Waterflow+flow1;
}

bill= (flow1*3)/100;

msg.payload=bill;
return msg;
```

Step9: Use Dashboard nodes for creating Web App & Displaying Water flow rate, Water level & bill calculation

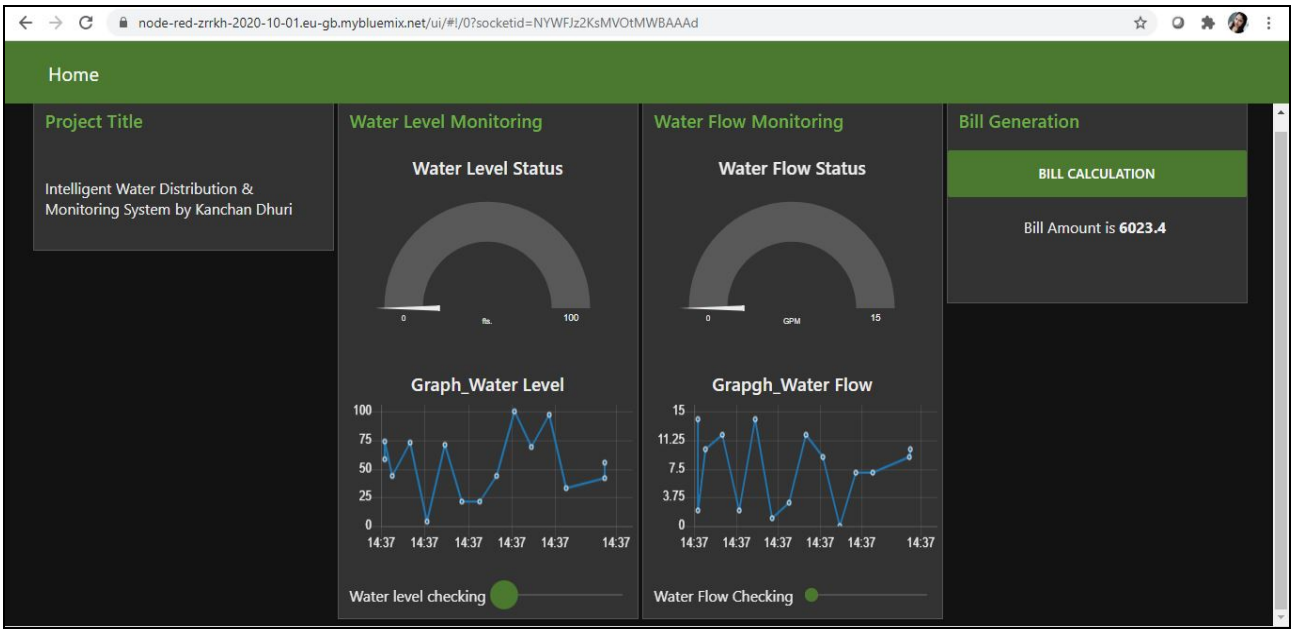


Fig10: Web APP

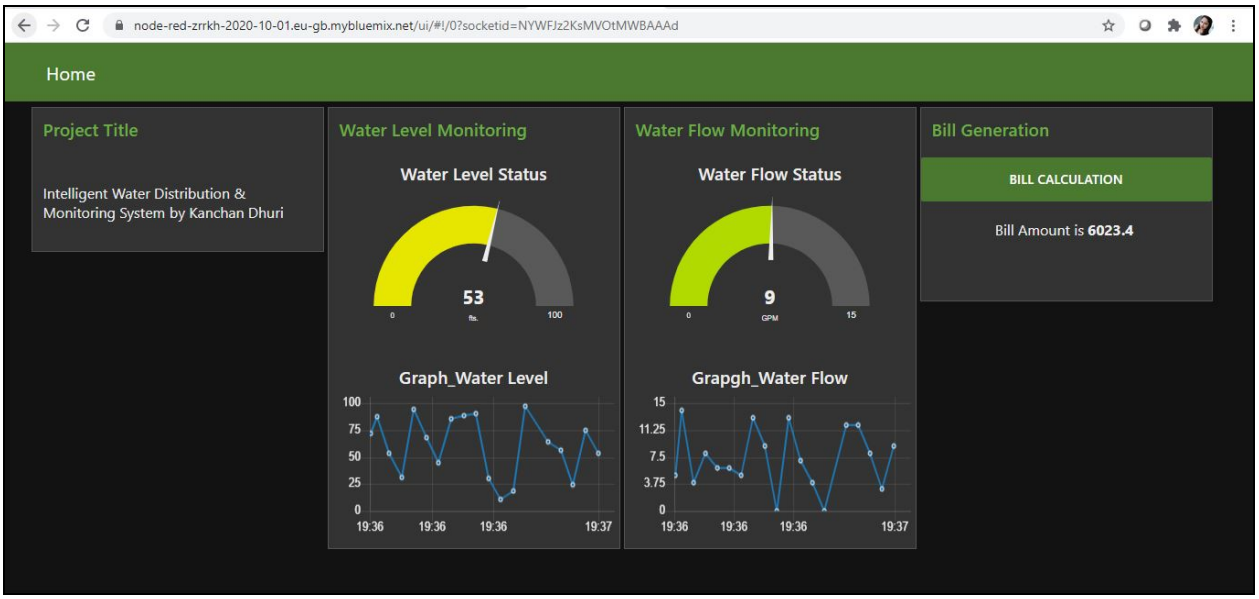


Fig11: Sensor readings & Bill Geneartion

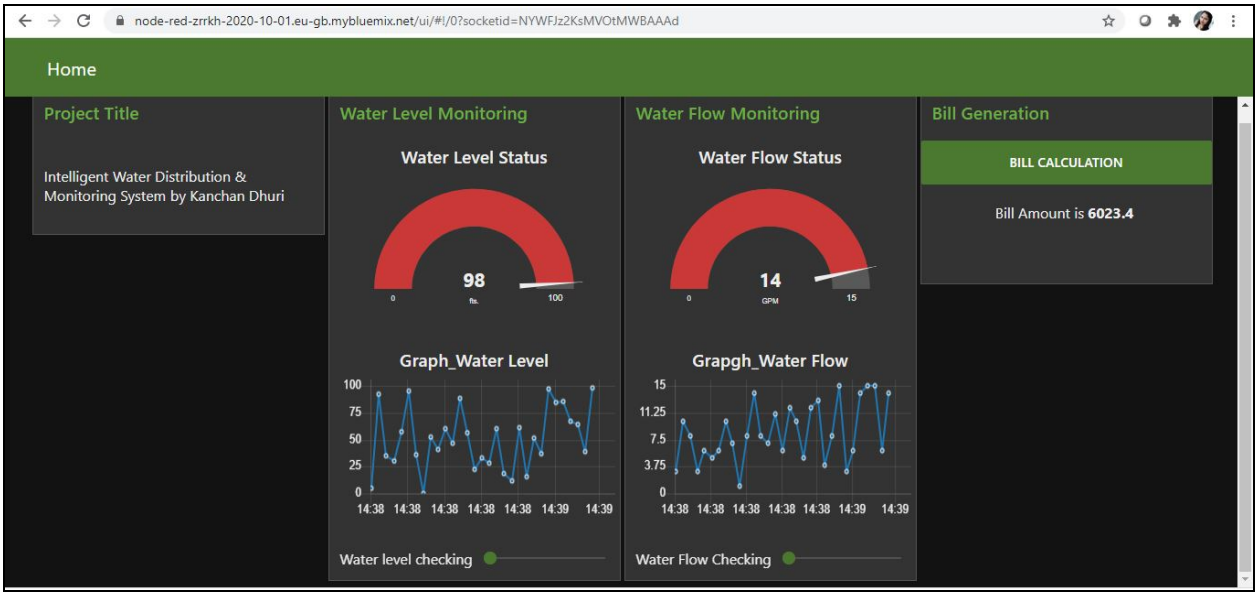


Fig12: Red color indicated Water level is above 90% of Total level of Tank

Step10: Results & Discussion

Here while monitoring water level different color code is used to indicated level of water, wether it is less than minimum threshold or greater than above threshold.

Red color indicated level more than 90fts and yellow color indicate level between 30to 80fts and green color indicate less than 30fts of the total level of Water Tank.

Bill is generated depending on water usage and water flow rate and considering cost 3/- per litre.

References:
[1] IBM Learning Resources